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ABSTRACT

This booklet describes how the departments and ministries of education in the 10 Canadian provinces and in the Yukon are using technology to ensure that elementary and secondary students in small and rural schools have access to a full range of educational programs. Services to adults in basic education courses are also included. Activities range from developing instructional packages to use of satellite dishes and computer networks. (ALL)

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NEW TRENDS IN DELIVERING ELEMENTARY AND SECONDARY EDUCATION TO SMALL/RURAL SCHOOLS

This information note offers a look at how departments and ministries of education in the ten provinces and in the Yukon are using technology to ensure that elementary and secondary students and adults completing their secondary education in small or rural schools, or in low enrolment courses, have access to a full range of educational programs.

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NEW TRENDS IN DELIVERING ELEMENTARY AND SECONDARY EDUCATION TO SMALL/RURAL SCHOOLS

YUKON

The Yukon Department of Education is responsible for the administration of all Yukon's public schools: ten schools in Whitehorse and 15 schools in rural communities outside the city. These rural schools vary in size from ten to 180 students. They also vary in grade offerings; six rural schools offer up to grade 12. The Yukon uses the B.C. curriculum and departmental examinations, and supplements curriculum with locally developed materials pertinent to Yukon experience.

The Department of Education does in fact deliver distance education to its rural students - by providing schools and teachers to even very small communities (e.g., a school for ten children). Students attending rural schools receive regular classroom instruction, as do students in the Whitehorse schools. The exception to this are students who live in areas too remote to have a school, who have the option of taking B.C. correspondence courses, and Whitehorse high school French first language students who are participating in a pilot tutor-assisted correspondence program.

Rural schools are supplied by the department's Learning Resources Centre, and Audio-visual Centre, and thus have access to a wide variety of materials that can be circulated to the communities. The department has not to date pursued specific high-tech distance education technology for its public schools but is exploring the possible development of new distance education technology that would be appropriate for their needs, for both adult education and public schools, but caution is being exercised to determine what is really needed, and what can best suit the needs, available resources, and student requirements.

Activities/Programs for Delivering Educational Programs to Small and Rural Schools

Yukon's rural schools are staffed in accordance with a formula which takes into account special requirements for offering an appropriate range of programs and services in each school. In addition to regular school programming, many schools have special programs such as Equivalency Education, Challenge Program, and special education assistance programs. To support Yukon school staff, the department has resource people who travel to the schools and provide assistance to teachers. These itinerant resource people cover the areas of primary education, intermediate education, educational computing, equivalency education/work experience, and special education (covering the spectrum from learning problems to challenge education).

In 1984, the department released a report entitled *Yukon Rural Education: An Assessment of Performance*. The topics covered by the recommendations included program delivery in general, but did not single out distance education program delivery and development. The department has not undertaken a specific study on the use of distance education in its rural schools.

There is no special budget allocated specifically for the development of distance education for public schools. The department is examining possible new directions in distance education technology and programming, especially as it pertains to adult education. However, no firm directions have been set at this time.

BRITISH COLUMBIA

Following wide public consultation, priority was given in British Columbia to specialized learning resources which would support course offerings in small remote secondary schools and improve the instructional process as well as the use of curriculum in these schools. As a result, the Ministry of Education consulted with school and school district administrations and developed a plan for a special project to address the major problem areas identified. In September 1986 a secondary school principal was seconded as project leader to assume the major responsibility for the administration and co-ordination of the overall project and for working with ministry staff in developing instructional packages, approaches and methods.

One of the goals of the Small Secondary Schools Project is to provide the opportunity for a quality education in a cost-effective manner in small secondary schools. The project strives to develop senior elective programs which more closely meet the needs of small secondary schools, to improve the performance of students enrolled in senior elective programs on provincial and scholarship examinations, and to increase community satisfaction with their school's total program and students' performance. Other objectives are to permit senior elective programs to be offered regardless of the number of students enrolled, without the services of a specialist teacher. As well, it seeks to foster the vocational development of students by allowing students to attain their personal potential, occupational and career objectives, by making programs more accessible to all students, by increasing participation rates in senior elective programs, enrolment retention rates and enrolment rates at post-secondary institutions.

The Development Plan of the Small Secondary School Project consists of the following goals:

1) To assist in the development of instructional packages that can be offered in a setting where students are enrolled in a variety of programs supervised by non-specialist teachers; 2) to assist with the continued regionalization of correspondence services; 3) to assist in the offering of in-service training programs; 4) to assist in the development of regulations to allow career preparation/ work experience to be more accessible to small schools; 5) to assist with the development of special education delivery models to more effectively meet the needs of small school districts; 6) to develop a joint use agreements resource guide; 7) to examine basic program/curriculum offerings for small secondary schools; 8) to consult with administrators and staff of small secondary schools; 9) to assist in the development of service levels and cost factors which more closely approximate the needs of small secondary schools; 10) to publish and distribute a monthly bulletin; and 11) to establish an external advisory commitee of school and district personnel.

Activities of the Small Secondary Schools Project are or have included • development of a grade 12 physics instructional package composed of print materials, video presentations and computer software for use in schools • establishment of a network of small secondary schools totalling 84 throughout the province for communication purposes and sharing of information • selection of an advisory committee of practising educators from the field • distribution of a newsletter to network schools on a regular basis • provision of funding for approved in-service activities in network schools • on-going consultation with network schools on various topics, including budgeting, program offering, timetabling, staffing and special education services.

The co-ordinator for this project is a member of the Program Development Division and co-ordinates the activities of two committees, one of which is made up principally of representatives from within the Ministry of Education, and the other which comprises practising educators from the field. Both these committees assist with the development of policies and action plans to help those small secondary schools that are part of this project. Money for the first two years of this project was allocated from the Fund for Excellence in Education as follows: 1986-87 - $362,000, 1987-88 - $300,000.

Future activities of the project include • a satellite dish for each of the small secondary schools in the province • a homework helpline (two-month trial basis) to assist students using the specialized materials developed through this project • the expansion of the capacity of the Provincial Education Media Centre to evaluate and license computer software and videoware which would support existing and future materials used by students in schools • development of grade 12 chemistry and biology instructional packages using the same format as grade 12 physics, for implementation in September 1988.

ALBERTA

A priority for Alberta Education is the Education Response Centres whose purpose is to enhance the quality and availability of education and services in the province, particularly for special needs and rural education. This is being achieved through the establishment of a province-wide network, the dissemination of information through computer and telephone-based systems and in print form; training, particularly for teachers and paraprofessionals; consultation, which provides effective approaches to the planning and delivery of individual education programs; and new and improved diagnostic and assessment methods and techniques.

Alberta Education is exploring new cost-effective technologies to reduce a number of long-standing problems faced by small schools which represent one-third of all Alberta schools - limited program and excessive teacher workloads; inadequate resources and technologies; low enrolments and the high costs of traditional instruction. As well, it strives to improve the effectiveness of current distance education in Alberta. The department has undertaken a three-year pilot project dedicated in part to demonstrating that distance learning is an effective solution to many of the problems experienced by small schools and that technology can provide effective support for distance learning and distance education tutors.

The principal objectives of the ERCs during the next three or four years will focus on establishing the province-wide network. Although all 150 school systems and 1,100 schools will have access to the network, the number of active members will probably be small in the beginning. However, it should grow rapidly as services become known and their utility and quality are demonstrated. Service will increase over the period as resources permit, and in keeping with demand from the field.

The distance learning activities will involve some 20 schools, organized into one or two consortia. The focus will be on curriculum development, using local teachers more effectively to provide instructional support, and employing existing cost-effective technologies to improve learning (e.g., telephone tutoring).

As much as possible, the Education Response Centres will use the message and bulletin board facilities of the ERC telecommunications network, and the voice-messaging capability of the multi-line disc system. A prerequisite for the more innovative, productive use of technology is the active participation of the private sector. [1]

One of the very successful technologies used in distance educational programming is audio-teleconferencing. This technique uses the existing telephone system, with the addition of a teleconferencing bridge, to interconnect a number of learning sites. In this way, learning centres can provide educational opportunities to rural communities in Alberta.

However, because the telecommunications rate structure was expensive and the time spent in teleconferencing was in hours rather than minutes, educational teleconferencing from the University of Calgary to northern Alberta was discontinued in 1983 and a request was made to the Minister of Advanced Education to explore other alternatives.

One of the alternatives which emerged was the Alberta Government Network or Regional Information Telephone Inquiry (RITE) system. This system was used primarily to enable rural citizens of the province to contact officials of the Government of Alberta and for government officials to conduct their business more efficiently. The RITE Network appeared to be an ideal solution as it was not used extensively outside regular government working hours when there was high demand for educational teleconferencing.

To test this method, a pilot project was designed to provide educational teleconferencing in 1984-85 from the University of Calgary to the north-western region of the province. The technical and educational success of this pilot project has resulted in the extension of RITE educational conferencing delivery to over 30 learning centres throughout the province. The use of the RITE system for educational teleconferencing provides a very positive benefit to rural Albertans by providing them with educational services. Given the growth of this system, Alberta is now formalizing the use of the RITE teleconferencing system to ensure that development and effective utilization continues. [2]

There is also, of course, the Alberta Correspondence School (ACS) which had its origins in 1923. Over the past three years, enrolment increased by almost 50%. In 1985-86, 40,147 students enrolled in more than 60,000 courses and submitted 373,000 lessons for marking. About 60% of these courses were taken by adults. The ACS's current budget is about $8.5 million. The Alberta Correspondence School makes available a full spectrum of courses to children at home and in school, and to adults who need to obtain a High School Diploma. The Alberta Correspondence School is concerned with finding new ways of meeting the dramatic expansion of demand. Alberta Education's Communications Branch operates an electronic bulletin board (ENET) which offers a variety of information to the province's school boards and others on the system. It offers news from provincial, national and international sources and also includes job opportunities, tips, curriculum, financial and policy information, etc. In addition to providing education news, a messaging system

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[1] Based on *Education Response Centres and Using Technology to Improve Teaching and Learning in Alberta* (Edmonton : Alberta Education , May 1987) , p. 1-4.

[2] Based on *RITE Educational Conferencing Guidelines and Procedures* (Edmonton: Alberta Education, May 1987), p. 1-2.

is available which allows users to communicate with one another through the host computer at the University of Alberta. A conferencing system is being planned.

The1985 Education in Alberta Policy Statement charts directions for change and is the framework for development in the immediate future. The Policy Statement identifies eight major principles, one of which mandates the improvement of educational opportunity through the use of technology:

The secondary education system must use technology to enhance learning and to facilitate access to equitable educational opportunities for all students regardless of ability, circumstance or location.

In addition, the Policy Statement provided several other references that relate to distance education:

- Students will master effective language and communication skills, including the ability to use communications technology.
- School jurisdictions should select the most suitable mode and place of learning for all secondary school programs.
- Besides facilitating distance education, new technologies may support greater individualization of some learning activities.
- In addition to assisting students with routine learning needs, distance education offers the potential for catering to the particular needs of students with special abilities or interests.
- In other areas, and for particular students, vocational education opportunities should be available in partnership with the community, and to the extent possible, through the use of communications technologies.
- An assessment will be required of organizations that facilitate student learning through the application of technology. The assessment will determine whether current organizations and facilities, such as ACCESS, the Alberta Correspondence School, the Alberta Vocational Centres and Athabasca University, might deliver services more effectively through an integrated and comprehensive plan. The benefits of such a plan would include the following:
- The remote or small rural school, limited in teacher personnel and/or resources, could use distance education to offer a broader choice of courses.
- Smaller groups of individual students would be able to pursue courses more economically.
- Distance education networks might alleviate the need to close schools and the negative effect this has on communities.
- Distance education networks could be formed to link schools to share teaching and other resources.
- Program reviews should involve the study and application of new developments, knowledge, and methods of delivery.

With these policy directives firmly in place, Alberta Education has developed a Four Year Plan (1987-1990) which sets out a number of priority initiatives in the field of technology. Beginning September 1, 1987, Alberta Education undertook a three-year pilot project to assess the potential of a variety of measures for distance education in selected school systems having one or more small high schools (those having fewer than 50 students enrolled in grades 10 to 12). The distance learning project included all or part of the following: onsite distance learning co-ordinators in each participating school; generalist or specialist teachers who act as tutors and markers;

teleconferencing networking between participating schools, and/or between schools and tutor/markers; off-campus partnership arrangements, and resource sharing between school and community; offering senior high courses partially by correspondence and partially through direct instruction; utilization of ACCESS, e.g., "Homework Hotline;" Very Small Aperture Terminal Technology (VSAT); Education Network Bulletin Board (ENET); or other appropriate tele- communication technology that is available and affordable; employment of teacher interns to assist distance learning co-ordinators on-site; development of video and audio cassettes and computer software to facilitate offering vocational or other courses; liaison with Alberta Correspondence School to develop appropriate components of the project; investigation of specific aspects of course delivery relative to student success, e.g., relationship of integrated software use to success in mathematics and science, relationship of word processing facility to success in language arts.

Technology in Education and Distance Education

Alberta Education encourages and supports the use of appropriate cost-effective technologies to improve educational management and administration, classroom management, and instruction. The following outlines the planning directions for technology and distance education.

Alberta Education will:

- develop a plan for the role of technology in education to the year 2000; [3]
- implement procedures and systems to encourage technological literacy, and integration of appropriate technology into all curricula;
- implement, in co-operation with stakeholders, a system for effective/efficient acquisition, production and distribution of educational software and courseware;
- pilot the implementation of an electronic computer network between the department and school jurisdictions to transfer information electronically, including student records and school finances;
- implement an office automation network in Alberta Education in which 80% of all clerical staff and 60% of all professional staff and managers use compatible microcomputers;
- encourage and support other government departments, consortia, and the private sector to produce and market educational software appropriate to Alberta's needs;
- implement policies and procedures in co-operation with stakeholders, to ensure that technology and software in Alberta schools are systematically replaced, upgraded and maintained; and
- implement an Electronic Information Processing Plan for the efficient and effective co-ordination of internal computer activities, including the establishment of a unit to provide information and services in the use of educational technology to the school jurisdiction.

Alberta Education through the Alberta Correspondence School will:

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[3] See Alberta's discussion paper entitled *Vision 2000: Vision of educational technology in Alberta to the year 2000.*

- develop a number of core courses to be del- -d via technology;
- pilot systems to enable students to access Alberta Correspondence School courses using technology;
- establish procedures with various partners for the development, delivery and marketing of Alberta Correspondence School products and services; and
- expand Alberta Correspondence School technology-based programs to rural areas, as appropriate.

Summary

These are the major policy statements which direct the development of distance education systems in Alberta. Collectively, they provide a base for developing new approaches in partnership with the various groups involved in the delivery of education. These new partnerships may involve the expansion of distance learning, greater utilization of technology, and greater participation of the community in the teaching-learning process. Policy directions may be summarized as follows:

- Distance education is seen as an integral part of the educational system with several cost-effective applications.
- The special needs of remote or small schools can be addressed, in part, through improved use of communications technology.
- An assessment of educational agencies that faciliate student learning through technology can lead to improved services.
- Individualized instruction should be encouraged and distance education can help small groups of students to study more economically.[4]

SASKATCHEWAN

In September 1987, Saskatchewan Education established its Distance Education Council. According to the Saskatchewan Education newsletter *Chronicle* (March 1988) the 16-member council has three main tasks:

- to advise the minister of distance education initiatives which would speed up the cost-effective delivery of quality programs, especially to rural and northern communities;
- to investigate new and developing technologies which could promote effective delivery of distance education programs; and
- to advise Saskatchewan Education's Executive Committee about groups which had applied for funding of distance education projects through the Education Outreach Fund.

The Council will ensure that this new technology provides Saskatchewan people with the

[4] Ian R. James, *Perspectives on Distance Education: An Occasional Paper to Stimulate Thought and Discussion on the Future of Distance Education in Alberta.* (Edmonton: Alberta Education, 1987), p. 4-9.

best education services possible for money spent and that it is delivered in an appropriate form wherever there is a need for it.

Saskatchewan Education supports the development of computer services in the province indirectly through an Educational Development Fund and a Provincial Computer In-service Program. The former is a grant program that allows schools to purchase computer hardware and software while the later provides teacher in-service on computer usage.

These programs operated by the department provide direct service to students. First, the province's correspondence school uses computer-managed-learning to maintain student records and keep an inventory on each of its students. It is also testing a computer assignment marking program and will soon be piloting a data bank of test items. Second, through a series of electronic bulletin boards distributed throughout the province (SaskEdNet), students can have access via modem to a career information database (Student Guidance Information System). The boards also offer students the opportunity to practise remote communication skills as part of the provincial computer curriculum. In some instances, these bulletin boards have an encyclopaedia on line so that it can be accessed by students for information retrieval and research. Third, a second career information database is available (Crossroads) that schools can use with students.

Funding for these activities is incorporated into the budget of various branches in the department. Consequently, no special budget has been allocated for all distance education activity.

MANITOBA

In recent years, Manitoba Education has undertaken initiatives in the areas of special needs education, the small schools support program, public schools financing policies, and access programs in the area of post-secondary, adult and continuing education. To fulfil these commitments, the department continues to be constrained by barriers such as geography (distances are great), demographics (sparsely populated area), language and the distribution of human resources (qualified personnel are often not available in small, remote centres).

In late 1987, a comprehensive program to co-ordinate distance education and technology in Manitoba was announced by Manitoba Education. Access to technological resources will be identified, developed and improved from kindergarten to post-secondary. A new Distance Education and Technology Branch will co-ordinate the Educational Technology Program of InfoTech, the Correspondence Branch, the Manitoba Technical Training Centre and the distance education activities (teleconferencing, videos, electronic mail) of Manitoba Educational Television (METV), the Correspondence Branch and the Adult and Continuing Education Branch. The new DET Branch will also identify what courseware is required and will encourage the development and purchase of provincial rights; it will examine emerging technologies for applications to education, explore partnerships with the educational technology industry and provide consulting assistance to schools and other educational institutions. Local communities will help in the planning, development and delivery of all programs and services.

Also being plannned is an inter-jurisdictional distance education project involving the four western provinces, the two territories and the federal government. A pilot training course will be

delivered through distance education in the remote and northern communities in all six jurisdictions.

As well, the audio-teleconferencing network, which for the past three years has delivered courses to students throughout the province, will be improved and expanded.

Correspondence Branch

The Correspondence Branch provides an opportunity for Manitobans to obtain a formal education (grade 1-12) regardless of geographical, economic, social or health situations; it assists schools in offering subjects to meet the needs of their students and provides an opportunity for adults to obtain adult basic education training, specific skill training, and general interest subject study.

The Correspondence Branch offers over 150 grade 1-12 and adult courses to approximately 10,000 students (14,000 course registrations) per year. There are 6,500 high school students registered in public high schools and 3,500 students, mostly adults, are home study students.

The branch consists of three major components: Program Development, Program Instruction and Program Delivery; as well as the GED program and Manitoba Educational Television.

The Program Development area provides citizens with the opportunity to obtain a grade 1-12 education through distance education courses. The staff of five program supervisors, 15 fee-for-service course writers, and clerical staff is responsible for the development and revision of the approximateley 150 grade 1-12 and adult upgrading and interest courses.

The Program Instruction area, which consists of a co-ordinator, a counsellor, and an elementary level instructor as well as 40 fee-for-service instructors, provides instruction and marking for approximately 10,000 students. This staff works with correspondence education contact people situated in most high schools in the province.

Program Delivery staff processes registration fees, course materials, assignments, tests, records, marks, certificates, enquiries, etc., for 14,000 course takers. The branch is in the process of investigating automation of student registration and records. This automation would provide more rapid registration, more frequent and comprehensive progress feedback to students and school staff and access to pertinent information regarding client profile, completion rates, achievement rates, etc., required for future planning.

The Correspondence Branch at present relies heavily upon an antiquated printing process for the development of course packages. It plans to implement desktop publishing and to utilize a laser printer which would enhance the visual quality of the print package as well as decrease costs of paper, printing and postage. The use of desktop publishing would facilitate more frequent revision of course material. The branch has attempted to expand upon print technology through the use of telecourses, computer-assisted learning, audio cassettes for languages courses, the toll-free line and telephone for tutorial support to students and the optical scanner for marking some tests. It is awaiting access to the Manitoba Information Network to provide information and rapid feedback to students and to reduce printing and postal costs.

The branch is in the process of purchasing courses from other provincial correspondence branches and adapting these courses for use in Manitoba. It also plans to begin brokering courses offered by other institutions in calculus, computers, psychology, business and agriculture as high school credits throughout the province.

Educational and Audio Teleconference Network (ATN)

The provincial Educational Audio Teleconference Network, established in 1984 and operated by the Adult and Continuing Education Branch, supports delivery of adult, college, university and high school programs throughout the province. During 1986, 22 courses to a total of 614 students in 37 different communities throughout Manitoba were delivered. ATN is used mostly as an instructional medium in conjunction with print materials and has also been used in conjunction with electronic mail in the Souris Valley pilot project and with video-based courseware in some of the programs delivered by Assiniboine Community College.

The network consists of four studio teleconference bridges and 40 convenor system sets (local speaker and microphone apparatus) that are loaned out to learning centres. Two bridges, each with a capacity to accommodate audio interaction between a maximum of ten learning centres at one time, are based in Winnipeg; Brandon and Thompson each have one bridge. The network reaches any location which has access to telephone service; a phone jack is required.

Selection of which bridge is used for what courses is made on the basis of the least total distance between all learning centres participating in a particular course. This is because telephone line charges are calculated according to the distance from the bridge location to all learning centres. Therein lies one of the major disadvantages of using audio teleconferencing in reaching distant learners; the greater the distance, the greater the cost. It is estimated that total long distance costs paid to Manitoba Telephone System by the various institutions who use the Teleconference Network in 1986 exceeded $25,000.

This factor can be overcome to some extent. One solution is to design a distribution system that would use large bridges in major centres to connect to smaller bridges strategically located in provincial regions. The smaller regional bridges would serve as feeders to learning centres within their region. In this way, most long distance calls from learning centres to bridges would be short distance, low cost, calls. Alberta, through its RITE Network has implemented such a system with the result that the aggregate long distance costs incurred by the province's delivery institutions have been reduced by over 50%. To achieve this effect in Manitoba would require all educational teleconference users to co-ordinate their programs and effectively negotiate with Manitoba Telephone System (MTS) to put in place services that would make this technically possible.

Manitoba Information Network (MINET) and the Educational Technology Program (ETP)

MINET is operated by ETP and InfoTech and provides computer conferencing, electronic mail service, and access to data bases. Approximately 200 schools throughout the province (over 50% rural and northern schools) now subscribe to this service. The annual basic school subscription rate is $100 with the line costs being picked up by InfoTech and MTS. Virtually any microcomputer can be connected to the network.

The Educational Technology Program provides professional development opportunities to teachers who can gain exposure to a variety of educational hardware and software products. From February to May 1987, 46 workshops were given at the ETP facilities. In 1986, ETP distributed over 12,000 diskettes and 9,000 pieces of print materials to schools. It also provided them with support for courseware development.

Manitoba Educational Television (METV)

Manitoba Educational Television, which began in November 1985, broadcast 165 hours of educational programming during its second broadcast season. It distributes programs to schools and the public (a) through its 9 to 10 a.m. Monday to Friday broadcasts on the CBC; (b) through early evening broadcasts on approximately 15 cable stations located throughout the province; and (c) through a 2.5 hour time slot Sunday afternoons on the new video dubbing service.

In addition to a variety of non-credit series and individual programs, METV broadcast five telecourses during the 1986-87 season and attracted over 450 students to college and high school credit courses. It has an estimated 25,000 viewers per week and was used in over 550 schools in its first year. During 1987 METV opened a small video studio and has been active in producing both segments for acquired programs and its own programs in co-operation with Frontier School Division and the Manitoba Government.

Developments for Future Delivery

Although current services provided are important and of high quality, there is an increasing realization that a consolidation would lead to better co-ordination and coherence of services. To this end, a Departmental Task Force has been established to examine the issues and provide recommendations for policy, content and delivery improvements. The department realizes that the successful use of distance education techniques is dependent upon the following factors:

- that appropriately designed courseware be responsive to the learner's needs, learning style, and environment;
- that elements which humanize the learning process and support the learner's needs for interaction and encouragement be inherent in the process;
- that adequate tutorial support which addresses the learner's problems be available; and
- that effective evaluation and student tracking systems be maintained.

In addition, Manitoba Education believes that distance education curriculum design should be guided by a set of criteria that:

- recognizes the multi-faceted aspects of effective distance education and the need for linkages and sharing among those with various learning systems, experience and resources;
- gives prominence to the principle of appropriate delivery being determined by the curriculum content and the needs of the learner rather than the constraints of the technology;
- recognizes that development should not be based on a single mode or technology nor be dependent upon off-the-shelf, stock, or uniform systems.

In 1988, Manitoba announced a $250,000 grant to the Manitoba Computer Assisted Learning Consortium (MCALC) to develop courseware for helping rural and northern Manitobans. MCALC is a non-profit consortium supplying educational software to western Canada and has a board composed of people from school divisions, government agencies, the University of Manitoba and private industry. The consortium has been asked to develop instructional courseware in vocational education, business education, social studies and language arts. Such courseware will let rural, native and northern people have equal access to programming which will enable them to enter post-secondary training and jobs at a higher level than was possible in the past.

ONTARIO

Both the Independent Learning Centre (ILC) and the Policy Analysis and Research (PAR) Branches are directly involved with small school projects. The Computers in Education Centre (CIEC), through a number of projects, has developed and is developing software programs for Ontario schools equipped with grant eligible microcomputers (GEMS). In 1987 an eleven-member Minister's Council on Educational Technology was established to advise the Minister of Education on all aspects of provincial policy related to the use of information technology in elementary and secondary schools. The Council will also help the Minister decide on the role technology should play in education and the most cost-effective way technology can benefit Ontarians.

Independent Learning Centre

The ILC creates independent learning programs specifically for small schools. In offering these programs to students, schools can combine computer technology and the learning materials supplied by ILC with resources and expertise from their community. Two courses are now available: *The Basics of Electronics* and *Digital Electronics*. These courses are designed to be used in small schools that do not employ a qualified electronics teacher. They require a staff teacher (who need not be certified in electronics) as facilitator and a community volunteer electronics expert. The school equips the electronics learning centre, and a microcomputer manages and tests each student's progress. ILC provides the course materials - audio tapes, computer management software, and student facilitator manuals. ILC also assigns the school a distance education teacher (who marks written tests and projects) and grants students the course credit. Participating schools, such as Bruce Peninsula District Secondary School, report a high completion rate, low absenteeism and good interest from local employers in participating in a co-op program using the electronic courses. Additional technologically-enhanced programs in computer studies are being developed for small schools. These courses wi ll integrate computer-assisted and print-based instruction materials.

ILC has completed a pilot test on Contact North (formerly the Northern Ontario Distance Education Access Network -- NODEAN) which involved the use of audio teleconferencing and facsimile transmission. A teacher, who is remote from the students, meets with them on the network for one hour per week. The students do independent study between broadcasts. Assignments are sent regularly to the teacher via facsimile transmission and the marked lessons are returned electronically to the students.

Much work is being undertaken to develop computer networks that have the potential to link educators in various locations across the province. EDAN (Educational Data Access Network) is an electronic data network project formed by TVOntario and sponsored by the Computers in Education Branch of the Ministry of Education. The first phase of this project involves connecting 75 field test sites across Ontario to the main "host" computer at TVOntario via modem to field test an alternative mail system and a conferencing system. It is hoped that eventually a network will link schools, school boards and government institutions in Ontario to encourage quick transfer of mail and information and for the satellite distribution of software and print materials.

There are two communications services that comprise the EDAN Network.. The Compute-Conferencing System (CoSy) supports the development of conference areas on-line where various

users can discuss a specific topic of interest. It is essentially a one-way communication system. Network users can leave comments or messages on an "electronic bulletin board" for other users to read. At this point, COSy does not support "real-time" conferencing in which users can interactively and concurrently discuss a topic (i.e., similar to telephone conferencing). The second service, the Remote Broadcast Communications System (RBCS), enables individual users to exchange files and data between themselves. Students in two classrooms in two different schools, for example, can exchange data files for a particular software program and, thus, compare notes, so to speak...

The EDAN project involves input from various agencies. The Computers in Education branch of the Ontario Ministry of Education provides the funding for the project. CemCorp (Canadian Education Microprocessor Corporation) is responsible for the development of the RBCS software and provides the follow-up training. TVOntario provides the training for CoSy and also serves as the administrator of the project. The Software Development Assistance Centre (SDAC) at OISE (Ontario Institute for Studies in Education) serves as a software training centre and a field test site.

What are the potential benefits of a network like EDAN for administration in the small high school? Principals and superintendents can use the conferencing facility to share information and perspectives about a wide variety of issues from class scheduling and staffing to professional development and curriculum management. Administrators can establish conferences to discuss ways of interpreting and implementing ministry policies such as OS IS. Principals and superintendents may arrange to have reports and policy documents transferred directly to and from regional and provincial offices. School district officials also may use the network to transfer reports and memos to and from the individual schools within the district. Furthermore, district-wide meetings can be held on-line. This would be particularly useful in areas where the schools are spread over a large area within the district. Eventually, teachers of the same subjects in different schools who are using the same software programs might be able to use the network to transfer data between classrooms. This may be a boon for certain subjects in which the different classes can swap information about the projects they are developing. For instance, a network in the northeastern U.S. is being used by science teachers to compare their students' results of testing water samples. Finally, we cannot forget the students. Many find it enlightening to conference with fellow students with the same interests in distant schools. This may be a real morale booster for schools in isolated areas.

What lies in the future of the EDAN project? According to Mary Wallace, who is one member of the administration team at TVOntario, Phase One only permitted the transferring of data from individual network users to other individual users. Possible future development may introduce multi-point broadcasting where one user could simultaneously send messages to a sub-section or all other network users. Furthermore satellite telecommunications technology may eventually be integrated into the network. Isolated sites could be fitted with satellite dishes to be used in the reception of remote broadcasts from the host EDAN computer at TVO. In the future, this may be a way of increasing the speed and ease of transferring software, data files and mail messages.[5]

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[5] Doug Hamilton, "Technology" in *Small Schools Network Newsletter* (Toronto: Department of Educational Administration, OISE, 1987), p. 6-7. Reprinted by permission.

Policy Analysis and Research Branch

The contractual research section in this branch funded a study of small schools in 1985. Dr. R. W. McLeod of Lakehead University conducted the study which was scheduled for completion in the summer of 1988. The title of the report is *Program Delivery in a Period of Declining Enrolment: A Study of Strategies Used in Small Secondary Schools, Particularly in Northwestern Ontario.*

Computers in Education Centre

The projects in this branch are for all Ontario schools , large or small, urban or rural. Since 1983, CIEC has been developing exemplary software programs and releasing them through the Ontario Educational Software Service (OESS) at TVOntario. An Education Software Catalogue is available through TVOntario. A second project inititated in 1987, the Educational Data Access Network (EDAN), has the potential of networking schools across the province and providing small schools, especially remote ones, with access to resources and services not now easily available to them.

QUÉBEC

The information presented here summarizes certain aspects of the activities and financing of the Direction des cours par correspondance of the Québec Ministry of Education.

Responsability

The Direction des cours par correspondance (DCC) is specifically responsible for distance education at the Ministry of Education and reports to the assistant deputy minister of administration. The DCC develops course programs in co-operation with the branches responsible for curriculum, in order that the courses offered respond to program demands and enable users to receive credit for them. As well, the DCC works closely with various partners. A project is under study to modify the status of the DCC to make it a Société de formation à distance.

During 1987-88 the DCC offered 192 academic and vocational courses at the secondary and college level. They consisted of 141 secondary courses (78 academic and 63 vocational courses) and 51 at the college level (11 academic and 40 vocational courses). Practically all these courses conform to the standards of the official programs at the secondary schools and colleges. In 1986-87, 33,396 persons were registered for correspondence courses and the majority of them were adults.

Distance education in Québec is not primarily aimed at the rural or isolated regions; the distribution of clients is in fact identical to the population of the province. Government policy regarding adult education has oriented the development of distance education as a service that does not compete with those dispensed by educational institutions but is supplementary when the lack of resources prevents schools from responding to these needs. Distance education also provides complementary services in priority areas and serves populations that are far away from educational institutions.

Courses offered by the DCC consists of printed matter although students can generally contact a teacher-tutor by telephone besides having regular communication by mail. Some popular courses are accompanied by a television series (Octo-puce, Le cours de mon argent). Computer technolology is extensively used for production and administration of these courses.

Financing

The financing of the DCC can be divided into four categories: basic budget allocations (about $2.7 million); special allocations ($520,000); transfer payments for projects financed from other ministries ($400,000); and two renewable self-financing funds, one for printed matter, the other for audio-visual productions ($1.2 million) that are managed with partners. In 1987 these two funds were consolidated into one that was directly managed by DCC. These four sources of financing provided a total operating budget of $4,820,000 for 1987-88.

Co-operation with Partners

The DCC has long collaborated with educational partners in various regions to offer training to common clients. This consists of a type of alternative training that combines a distance education course by the DCC to a technical course of 45 hours given by a school board in a classroom and a work placement supervised by the board. Courses in four sectors are offered in this manner: nurses' aides, water treatment operators; rural volunteer fire fighters; and silviculture.

NEW BRUNSWICK

The New Brunswick Department of Education is becoming increasingly involved in projects dealing with new approaches to program delivery in small and rural schools. Furthermore, there is a realization that these same techniques are often equally applicable to urban settings where particular program offerings are deficient in some way.

The province has an on-going pilot program in three schools which exemplifies this concept. In these settings (two are rural and one urban) the music program is delivered with minimal specialist involvement. These programs were implemented because few junior high and high schools offered a satisfactory music program due to a lack of qualified teachers. This situation was compounded by the lack of university entrants with a high school music background on which they could build, perhaps as part of an arts or education degree. The intent of the program was not to expand the programs, but rather to deliver the present program to a greater percentage of those students who wish to take it. The logical approach to providing such a program was felt to be by distance education.

The major aspects of the course are covered by videotape programs, computer-assisted instruction, and programmed texts in conjunction with a reference library of compact discs, interactive computer instruction on music keyboards and access to video taping equipment to relay information between the three pilot settings and to the instructor. The course is very popular and evaluation of it has been undertaken.

The department is also in the process of establishing some pilot settings which involve the use of computer networks - one or more stations which can be taken over by remote personal computers and which can make use of the educational software. A departmental committee was set up in the fall of 1986 to explore distance education in the broadest sense and this committee continues to meet and track developments in this area.

Some aspects of distance education are the responsibility of the Department of Advanced Education and Training (namely, the correspondence courses services); however, the Department of Education has taken a leadership role in the technological aspect of distance education and the Evaluation Branch now assumes these responsibilities. No Department of Education budget is specifically allocated for distance education per se. Special projects and pilots are funded on an "as needs" basis.

NOVA SCOTIA

With its largely rural population, Nova Scotia must deliver programming that meets the entire spectrum of needs from provision of education to the children of remote Sable Island to delivery of the International Baccalaureate at one of the larger consolidated education centres serving a fairly widespread and diverse rural population.

Traditionally, school television broadcasting and correspondence courses were the main means of reaching children in remote locations. The former continues, but in a very much more flexible format. With the use of video, schools may tape from school television programs broadcast at advertised times, or they may send in blank tapes for copies to be made by Education Media Services in Halifax. They also have equal access by mail to a wide range of multi-media resources advertised yearly in the Resources Catalogue.

Computer education is another means of bridging what was once much more of a gap between rural and urban schools. With the assistance of a federal program to promote technology in school, $2 million has been allocated over the past two years to ensure that all schools have at least the same amount of basic computer hardware. Representatives from each area attend workshops to ensure that teachers are able to provide computer instruction and they are expected to duplicate them for collegues later. A few years ago, a special program series on the choice, use and application of personal and other smaller computers was beamed into all schools.

Correspondence courses continue as a tried and tested medium, especially for children in lighthouses and other remote locations. Indeed, they have gained popularity for a wider segment of the population as older students return to school in greater numbers, and require individualized programs to meet their particular needs. The courses themselves have been altered to fit the times with the addition of vocational and technical courses that would have been impossible without the availability of technology and related technical resources.

Computerized timetabling has been of tremendous assistance in helping rural schools in particular to deploy their often smaller teaching staff and resource base as skilfully as possible to meet a wider range of student needs and demands.

There is no committee as such set up for the specific purpose of studying rural schools. However, the Minister's Advisory Committee on the Public School Program, in the course of its recent review,

made a particular study of rural schools, their existing capabilities, and the implications for them of recommended changes in the high school curriculum.

No particular branch of the Department of Education has sole responsibility for this area. No special funding is earmarked, but the general formula funding to school boards has been weighted as required to ensure that rural school boards are not financially disadvantaged by their special circumstances.

PRINCE EDWARD ISLAND

Although Prince Edward Island is small and mostly rural, it does not have the same level of difficulty in providing services to small schools that many other provinces do. In fact, very few of the schools would meet the definition of small used in other provinces. This results from the large-scale consolidation of PEI schools that took place in the early 1970s and the fact that it does not have the same distances that isolate small schools in the larger provinces. As a result, there is no designated responsibility for small school programs in the department and no committees working in this area.

However, the province does have needs for small school services in a few areas and has implemented specific programs to deal with these needs. It established a Small School Assistance Program to allow school boards to improve and equalize programs and services. This funding program gives extra assistance to boards for additional teachers above the normal funding ratio.

The needs of handicapped children put additional pressure on small schools. Although there is not a special program in this area for small schools, funding for special education services is provided by the department outside the normal student/teacher ratio; it is negotiated directly with the boards and allows the province to fund those small schools which provide services to handicapped students. In addition, PEI co-operates with the other three provinces in the Atlantic Provinces Special Education Authority (APSEA). These programs were developed to provide services to children with low-incidence handicaps and specifically reflect the needs in these areas in the region.

The department has also organized its vocational educational programming to reflect the needs of smaller and more rural high schools. At present, vocational education in the schools is delivered in conjunction with Holland College. Projects undertaken with the boards which reflect the specific needs of the school include the Co-operative Work Study Program and the Experimental Education Work Program.

NEWFOUNDLAND

In 1987, The Newfoundland Department of Education released the report of the Small Schools Study Project - an in-depth study of small schools and the delivery of educational programs to students in these schools. The report, by Dr. Frank Riggs, a professor of the Faculty of Education at Memorial University, directs its attention to identifying the unique problems associated with small

schools — teaching strategies, program modifications, support services, personnel and finances. It contained 33 recommendations which stress the need for improved programs for the small schools. It recommends modifying the primary and elementary curriculum and the provision of additional teachers and financial resources for small schools. It also recommends the introduction of a distance education program at Memorial University, further school consolidation, and increased co-operation among religious denominations in providing educational services to students who must attend small schools. The report was presented to the Minister of Education and is now under consideration.

The initial response to the report has been to provide additional teacher resources to small schools and to begin the development of a business education program which may be in the pilot stage by September 1988. The small schools study project recommended a definition of small schools, which was accepted and is now in use by the Department of Education. This definition, which will be used to provide financial and personnel resources to small schools in the province, identifies a small school as having a mean grade enrolment of 25 or fewer if there are high school grades taught in the school.

In Newfoundland, education staff positions are allocated by the Department of Education to each of the individual school boards in the province. The boards in turn hire appropriate personnel to carry out their educational program. Under the formula now in place for allocating teacher resources, each district receives 15 teachers per one thousand pupils enrolled in small schools and additional resources if the mean school enrolment in the district falls below one hundred and fifty. Teachers are also allocated under this formula for special needs children : educable mentally retarded children and educationally disabled children. This formula is staggered to provide more resources to districts having remote schools or having schools spread over a large geographical area.

In distance education, the department has undertaken a project to develop one course which will be available to districts beginning September 1988. This course will be monitored as a pilot project; additional courses may be introduced yearly.

There is no specific branch of the Department of Education that has responsibility for carrying out the recommendations contained in the small schools report. At present there is no financial program designed to target resources to small schools. However, there are some monies made available to school districts who operate schools in remote areas and have high energy costs.

The issue of delivering educational programs in small schools is a high priority within the Department of Education. Enrolments continue to decline and the provincial population seems to move from rural to urban communities thereby creating more small schools. At the same time, existing small schools get smaller, thus compounding the problem of program delivery. The study has addressed many of the concerns in this area and the recommendations in the report, together with response and input from the field, will enable the department to develop a long-range plan aimed at improving program delivery to students who must attend these small schools.